

CLAIMS:

- 1     1.     An information processing system comprising:  
2             first and second of levels of a storage hierarchy, wherein accessing information  
3     in the first level consumes more energy than accessing information in the second level;  
4     and  
5             a processor for writing information to the second level of storage based on  
6     energy-conserving criteria.
- 1     2.     The system of claim 1 wherein the energy-conserving criteria comprise a  
2     collection of heuristics.
- 1     3.     The system of claim 1 wherein the energy-conserving criteria comprise system  
2     state information.
- 1     4.     The system of claim 3 wherein the system comprises a storage input/output  
2     subsystem and system state information comprises whether the storage input/output  
3     subsystem is using one or more specific files.

1 5. The system of claim 3 wherein the system state information comprises at least  
2 one factor from among the following factors:  
3 the storage input/output associated with one or more predetermined software  
4 applications;  
5 a sequence of storage input/output operations;  
6 observed interactions with the first level of the storage hierarchy and wherein  
7 the collection of heuristics infer the state of the second level of the storage hierarchy;  
8 and  
9 a type of energy source powering the system.

1 6. The system of claim 1 further comprising a power source for the system and  
2 wherein the system state information comprises information identifying the amount of  
3 energy left in the power source when the system is disconnected from other sources of  
4 energy.

1 7. The system of claim 3 wherein the system stores current user profiles and the  
2 system state information comprises whether storage input/output data are associated  
3 with a current user profile.

1 8. The system of claim 3 wherein the system stores current user preferences and  
2 the system state information comprises whether storage input/output data are  
3 associated with current user preferences.

1 9. The system of claim 3 wherein the system state information comprises at least  
2 one factor from among the following factors:  
3 the storage input/output data associated with the characteristics of the  
4 connection between the first and second levels of the storage hierarchy;  
5 the storage input/output data associated with characteristics of the connection  
6 between the system and at least one second level of the storage hierarchy;  
7 the proximity of the storage input/output to events that change the state of the  
8 at least one first level of the storage hierarchy;  
9 the proximity of the storage input/output to a previous interaction with at least  
10 one first level of storage hierarchy;  
11 an indication of a hard-disk drive spin-down event; and  
12 physical characteristics of the second levels of the storage hierarchy.

1 10. The system of claim 3 wherein the system state information comprises physical  
2 characteristics of the second levels of the storage hierarchy.

1 11. The system of claim 1 wherein the second levels of the storage hierarchy are  
2 implemented using Flash memory.

1 12. The system of claim 3 wherein the system state information comprises the  
2 number of remaining write cycles.

1 13. The system of claim 1 wherein the processor is for removing information from  
2 the second level of storage based on energy-conserving criteria.

1 14. The system of claim 1 wherein writing information to the second level of storage  
2 further comprises:

3 a mapping schema between cache files in the second level of storage and disk  
4 files in the first level of storage, wherein each cache file is named with a logical  
5 cluster number of its corresponding disk file.

1 15. The system of claim 1 comprising a hard disk drive comprising rotating  
2 magnetic media comprising the first level storage and a cache comprising the  
3 second level storage and an application-specific integrated circuit for managing  
4 the cache according to the energy-conserving criteria.

1 15. An information handling system, comprising:  
2 first and second levels of storage, wherein accessing the first level of storage  
3 uses more energy than accessing the second level of storage;  
4 an energy use detector for determining the level of energy being used by the  
5 system; and  
6 an arbiter for writing information to second level storage when the energy use  
7 detector determines that the system is being powered by a battery.

1 16. An information handling system, comprising:  
2 first level storage for storing information;  
3 second level storage for storing information according to a set of energy-  
4 saving criteria;  
5 a battery level detector for determining the level of charge in a battery; and

6           a controller for writing information to the second level of storage when the  
7 battery level detector determines that the battery charge is below a pre-determined  
8 threshold of charge.

1 17. A method for managing storage of information in an information  
2 processing system comprising two levels of storage wherein a first level is managed  
3 and a second level is unmanaged wherein storing information in managed storage  
4 consumes less system resources than storing information in unmanaged storage, the  
5 method comprising:

6 monitoring the system to determine whether the operating state of the system  
7 satisfies one or more energy-conserving criteria; and

8 storing information in managed storage when the operating state of the system  
9 satisfies one or more energy-conserving criteria.

1 18. A computer readable medium comprising program instructions for:

2 monitoring a system to determine whether the operating state of the system  
3 satisfies one or more energy-conserving criteria; and

4 storing information in managed storage when the operating state of the system  
5 satisfies one or more energy-conserving criteria.